



The Effects of Musical Therapy on Parkinson's Patients



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ABSTRACT

Parkinson's disease is a progressive neurodegenerative disorder that affects motor skills and mobility. Despite the studies conducted to find the treatment of this disease continues, there is no definite treatment yet. Besides the treatment to control and slow down the disease, patients also need the support of different methods and psychosocial interventions. Music therapy, as one of these supportive interventions, has been found to have positive effects supported by current studies. Positive improvements are achieved in the general well-being of the patients with effects such as rhythm follow-up by active or receptive methods, affect and

socialization created by the authorities. There are many studies in which music and rhythmic sounds are used to prevent loss of balance and, therefore, the risk of falling. Many studies investigating the effects of music therapy for Parkinson's patients have found that it has positive effects on improving the motor skills of patients, preventing balance disorders and the risk of falling, ensuring psychological well-being, and socializing many people with the same problems in studies that apply music therapy as a group. In this study, which compiles the general effects of music therapy in Parkinson's patients, the results of current studies will be shared.

KEYWORDS: Parkinson's Disease; music therapy; aging.

KEY PRACTITIONER MESSAGE

1. Parkinson's disease is a degenerative brain illness that affects several brain areas. To manage and slow down the condition, patients need a combination of treatments and psychological interventions in addition to drugs.
2. When it comes to treating diseases in Anatolian history, the approach of offering support and treatment via music plays a significant part.
3. Music therapy has been shown to benefit Parkinson's disease patients in a variety of ways, including improving motor skills and lowering the risk of falling. Music therapy, when used in a group setting, has been shown to improve psychological well-being and socialize a large number of people who are dealing with similar issues.

INTRODUCTION

Parkinson's is a neurological disease that progresses degeneratively in several parts of the brain. James Parkinson described this disease in 1817 as "shaking palsy," which is characterized by the loss of dopaminergic neurons in the substantia nigra in the upper brain region. While the symptoms are first seen in only one-half of the body, they spread to the whole body in the later period, and in the most advanced stage, the patients completely lose their ability to move (akinesia) (Seyyar, 2015). Although the exact cause of the disease is not known, some risk factors have been identified. Patients may need care due to symptoms such as trembling of hands, arms, legs, jaw, and face, stiffness of the arms, legs, and trunk, slowness of movement, poor balance, and coordination (WHO, 2016). Although there are some current studies, there is currently no definitive treatment for Parkinson's disease. Treatment is applied to slow the disease and increase functional lifespan.

The improvement of the patient's well-being with a multidisciplinary team is very important and constitutes the focus of treatment (Fleisher et al., 2018). In addition to the clinical symptoms, it can be said that the prodromal period of the disease is quite long. However, it is not prioritized because the disease cannot be resolved with clear and definitive treatments and cannot make a meaningful contribution if this stage is noticed. Since there are approximately 6 million variations of Parkinson's disease known in the world and individual preferences, tastes, and emotions are included in this heterogeneity, personalized methods are mandatory in the treatment and management of the disease (Bloem et al., 2020). Besides, it can be said that applications such as music therapy are important both for people who age as a preventative and after the diagnosis of Parkinson's. There are many studies in the literature showing the significant effect of music therapy and music-related practices on Parkinson's disease.

Through a brief review of the evidence, this article intends to contribute to the literature by highlighting the grounds for suggesting music therapy as a conventional and risk-free treatment as a support practice in the management of Parkinson's disease.

Parkinsonism and Parkinson's Disease

Parkinson's disease is a neurodegenerative disease with an increasing incidence nowadays. When the

causes of the disease are examined, it can be said that while the effect of genetics is 3–5%, environmental effects are also important triggers. Although there is a monogenic tendency, 90 genetic risk variants can reveal 16–36% of the risk of intergenerational transmission of non-monogenic Parkinson's disease (Bloem et al., 2021). Parkinson's disease's prodromal phase can even begin as early as 20 years of age (or possibly more) from the onset of motor parkinsonism (Heinzel et al., 2019).

In professions with creative content, decreased creativity, sleep difficulties, and other abnormalities have spread during the previous several days. Even if the warning symptoms aren't noticed, it can happen. This situation is seen in many people who are diagnosed with Parkinson's at advancing ages. The process of making the diagnosis is generally based on the clinic. In particular, the presence of bradykinesia with the cardinal signs of resting tremor, rigidity, or both is used to diagnose the disease. However, these problems do not fully explain the disease. Prognostic counseling for non-motor symptoms is critical and provides an accurate description of the subtypes of the disease (Feigin, 2019).

Conditions such as slowing down in movements, stiffness in the muscles, deterioration in posture and balance are called parkinsonism, where similar symptoms are seen but may be caused for different reasons. Since these two tables are very similar to each other, history, imaging methods, and laboratory results can be used to distinguish them. The causes of Parkinsonism can be summarized as follows (Yaman & Ceviz, 2013, pp. 104–105): (1) *Idiopathic Parkinson's Disease* is an illness with no recognized cause. (2) *Parkinson-Plus Syndromes* relate to substantia nigra losses that are followed by losses in the striatum and other regions of the brain, as well as degenerations as a result of these losses. As a result, certain new symptoms have been noted. (3) "*Secondary Parkinsonism*" can be caused by vascular illnesses of the substantia nigra, tumors, chemical exposure such as carbon monoxide, manganese, and intoxication, normal pressure hydrocephalus, and adverse effects of schizophrenia medicines. (4) *Parkinsonisms Accompanying Hereditary Neurodegenerative Diseases* is the type of Parkinson's disease seen in samples like Wilson disease, which begins in early adulthood. Because it's typically curable, it's vital to have a comprehensive diagnosis as soon as possible.

The disease is more common in adults over the age of 60, is more common in men, and affects people

from all socioeconomic groups. Parkinson's disease is believed to affect one out of every 100 adults over the age of 65 (Yaman & Ceviz, 2013).

Etiology

The basal ganglia in the middle part of the brain consist of structures that communicate with each other. The basal nucleus consists of five pairs of nuclei located in the white matter, deep in the hemisphere of the brain. These structures are nucleus caudatus, putamen, globus pallidus, substantia nigra, nucleus subthalamic, capsula interna, thalamus, corpus callosum (Poewe, et al., 2017). Three main problems are observed when a disease related to the basal nucleus occurs to use abstract thought to dominate a voluntary movement (Köylü, 2017): involuntary movements, deceleration, and insufficiency in movements although there is no paralysis, disturbances in posture, muscle tone, and gait.

The loss of dopamine receptors seen in Parkinson's disease is associated with widespread degeneration of the substantia nigra. Although the general cause of the disease is unknown in Parkinson's, the known risk factors can be listed as: male gender; advanced age; genetic predisposition; insufficient intake of vitamins and minerals such as B3, B6, zinc, iron; oxidative stress; infections; use of anti-cholesterol and anti-inflammatory drugs; environmental toxicity and pesticide exposure (Gökçe & Boyraz, 2017).

Lifestyle decisions and environmental factors come to mind while considering the cause of Parkinson's disease. In addition, being 60 years of age or older is another important risk factor (Ascherio & Schwarzschild, 2016). This disease is more common in males than females. As with many other neurodegenerative diseases, telomere dysfunction, genomic instability, epigenetic changes, ubiquitin-proteasome, autophagy-lysosomal system, and mitochondrial defects may predict neuron loss (González-Casacuberta et al., 2019). Although the patients have postural instability and gait disorder with a tremor in the foreground, the phenotype of this condition is correlated with the severity of the disease. Clinical subtypes show different phenotypes according to the underlying pathological causes. However, since these phenotypes differ in prognosis and with treatment, this situation has not been given much attention (Jankovic & Tan, 2020).

Symptoms

Parkinson's disease begins insidiously and progresses slowly. Parkinson's disease first appears with nonspecific symptoms. Idiopathic REM sleep behavior disorder, which can increase Parkinsonism-related dementia by 63%, is the leading prodromal symptom that is expected to cause prominent symptoms of Parkinson's in the following periods. This risk is much higher in the older population and those with a history of neurological anomalies. The abundance and variety of prodromal symptoms increase the risk of Parkinson's with prominent symptoms (Darweesh et al., 2018; Fereshtehnejad et al., 2019; Huber et al., 2011).

In the prodromal stage, the process begins with discomfort, exhaustion, numbness, tingling, slowed motions, and tremors at rest, and proceeds with considerable losses. Over time, you may notice a loss of scent, diarrhea, weariness, weakness, and personality changes. Geriatric syndromes such as sleep disturbances and malnutrition might occur as a result of therapy side effects or disease-related problems. Tremors, stiffness, bradykinesia, and gait abnormalities are common motor function deficits (Duncan et al., 2013, p. 200; Kadastik-Eerme et al., 2016, p. 2; LaRocco, 2015). The sickness is followed by many classifications and scales that classify the symptoms. Table-1 summarizes one of these scales, the Hoehn Yahr Scale (Gökçe & Boyraz, 2017).

Table-1. Hoehn-Yahr Scale

Stages	Symptoms
Stage I	Unilateral tremor, rigidity, akinesia, postural instability. Symptoms are mild.
Stage I-II	There is unilateral axial involvement.
Stage II	Bilateral tremor, rigidity, akinesia, decreased facial expressions, swallowing difficulties, axial rigidity (especially in the neck region), forward-bent posture, slow or shuffling gait, general stiffness, postural abnormalities.
Stage III	In addition to the findings in stage II, balance disorder begins to be observed. Even with moderate dysfunction, the patient can perform activities independently.
Stage IV	The patient needs help with some or all of his daily activities. There are severe symptoms and a visible disability.
Stage V	The patient is wheelchair-bound or bed-bound.

Music Therapy Interventions

When the definitions of practices related to music

therapy in the literature are examined, approaches that differ around certain principles are seen. While the definition of music-based interventions covers all the different types of interventions that use music for therapeutic purposes, it is stated that music therapy is music-based interventions applied by a trained music therapist using various elements of music (such as singing, composing, dancing, listening) within a program. Musical medicine, in which music is purely medical, includes a variety of music-based interventions offered by health professionals that have health-promoting goals but do not include the therapeutic relationship and musical interplay that are often characteristic of music therapy. Rhythmic auditory stimulation is a method applied by matching natural rhythmic functions (such as balance and walking) with a certain rhythm (Sihnoven et al., 2017).

These basic distinctions are elaborated for different types of diseases. For example, music-based interventions based on playing rhythm instruments are used to improve motor skills and improve circulation in the upper extremities in patients with a history of stroke. Methods such as singing and mouth rhythm are recommended against aphasia. The type of music therapy that is associated with actively making and participating in music is considered active, and the type based on listening is receptive (Sihnoven et al., 2017; Tümeta, 2017).

Music Therapy in Turkish Culture

Music is a cultural phenomenon and has different structures in different parts of the world. At the same time, music is an important element that has been used to improve health from history to the present. Music is applied as a therapy and support method, especially for some diseases that have morally compelling effects (such as mental illnesses, pain complaints, and terminal illnesses). When we look at Anatolian history, the approach of providing support and treatment with music is based on the old group therapy practices in the psychiatric hospitals established in Damascus, Cairo, and Bursa during the Ottoman period, trying to give relief to the souls of the patients with a traditional instrument called the "baksı" of the shamas in Central Asia (Seyyar, 2015). Farabi (870–950) categorizes the impact of maqams on the soul in Table-2 (Tümeta, 2017).

Interventions are carried out on a regular basis in this situation. In 2019, Can and Yılmaz conducted a study in Turkey that looked at scholarly literature related to music therapy. The receptive technique was adopted in the majority of the 121 studies, which were mostly

unpublished publications (N = 37) and theses (N = 34). (Can & Yılmaz, 2019). These studies show how music therapy may help people in a variety of settings.

Table-2. Maqams in Turkish Music and Their Effects

Maqam	Effects of Maqam
Rast	It gives people "sefa" (joy, peace).
Rehavi	It gives people "beka" (perseverance, the idea of eternity).
Küçük	It gives "hassasiyet" (sensitivity) to people.
Büzürk	It gives people "havf" (feeling of shyness or avoidance).
Isfahan	It gives people the ability to move and a sense of confidence.
Neva	It gives people a taste and refreshment.
Uşşak	It gives a person "dilhek" to laugh.
Zirgüle	It gives people sleep, which is called "nevm".
Saba	It gives people "şecaat" (courage, strength).
Buselik	It gives strength to people.
Hüseyni	It gives people "sulh" (calmness, comfort).
Hicaz	It gives a person "tevazu" (humility).

Effects of Music Therapy and Music-Related Support in Parkinson's Patients

Loss of dopaminergic neurons and progressive neurodegenerative processes observed in Parkinson's patients may lead to loss of balance. There are many studies in which music and rhythmic sounds are used to prevent loss of balance and, therefore, the risk of falling. In the study conducted by Dalla Bella et al. in 2015, it was found that melodies and metronome sounds played outside rhythmically allowed long-term improvements in motor skills (such as an increase in walking speed and an expansion in stride length). This process, which is closely related to the brain mechanisms in the cerebellum-thalamocortical network, also contributes to issues such as timing and coordination in movements, perception, and performing the simple tasks given within the scope of studies quickly and accurately. Based on the improvements in timing skills, sensorimotor abilities, and perception, it was recommended to recommend music-related support practices to Parkinson's patients (Bella et al., 2015).

Another research on this issue included a dance program as part of music-related support methods. Perreira and her colleagues did a thorough review of 45 randomized controlled studies that investigated music therapy and music-related support activities for Parkinson's patients and included older citizens (Perreira et al., 2018). Some of the research included in the study discovered that music had a substantial influence to walk with and without rhythmic

sound stimulation. When it was explored whether headphones or speakers were more successful in the application of music therapy, it was shown that both applications may have considerable impacts. According to the majority of research, music therapy should be utilized to enhance motor abilities in Parkinson's patients. The results of an intervention trial with one participant between the ages of 40 and 60 who was in Stage II and Stage III of the Hoehn and Yahr Scale were comparable in a recent study by Park and Kim (2021). The results revealed that drumming with rhythmic cueing considerably boosted the experimental group's engine capacity and mobility.

Brown et al. (2010) investigated the performance of Parkinson's patients who walked a ten-meter path with and without music and discovered that music had a significant positive influence (Brown et al., 2010). At the same time, Dotov et al. stated that music has additional benefits such as reducing anxiety, increasing well-being, correcting postural instability, improving cognitive functions, and reducing fatigue (Dotov et al., 2017). On the other hand, Pohl et al. (2020) emphasized that, according to mixed-method studies in which they evaluated group music therapy quantitatively and conducted focus group discussions with the physiotherapists of the group, group music therapy in Parkinson's patients improved both social, psychological, and medical conditions. The group-based music intervention adds value to mood, alertness, and quality of life in patients with Parkinson's disease.

In the example of Turkish culture, however, no study was found in which Turkish music maqams were used in Parkinson's patients, but Çarıkçı et al. found that the oscillation listened to with a metronome made a significant difference in the rhythmic walking abilities of Parkinson's patients. In the intervention study conducted on 26 people, it was found that the music intervention had a positive effect on walking by increasing the walking speed and stride length of the individuals in the intervention group (Çarıkçı et al., 2020).

CONCLUSION

In the case of progressive and incurable health issues, it is possible to state that the disease has an impact on health-related quality of life and self-efficacy. In this case, the goal in this situation should be to maintain and increase the general well-being of patients with therapeutic interventions and programs that will provide biopsychosocial support. In this respect, interventions that have positive

effects in different areas are recommended not only for medical treatment and healthy living habits, but also for socialization, protection and development of physical abilities, and psychological well-being.

Music therapy is one of the easiest, most effective, and cost-effective forms of these supportive treatments. Many studies investigating the effects of music therapy for Parkinson's patients have found that it has positive effects on improving the motor skills of patients, preventing balance disorders and the risk of falling, ensuring psychological well-being, and socializing many people with the same problems in studies that apply music therapy as a group. With the training programs structured by the Ministry of Health, music therapy takes its place as a new profession in the field of health. In addition, receptive music therapy can also be applied by periodically listening to melodies structured by different health professionals.

Various research in the field have shown that even singing, counting rhythms, or doing the provided motor skill tasks while accompanied by rhythm may make considerable benefits. In this respect, it can be concluded that the application of music therapy and rhythm studies to Parkinson's patients should be recommended for the patients to have a pleasant time, socialize, develop their motor skills and feel competent.

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